Klübersynth GEM 4 N

Synthetic high-performance gear and multipurpose oils based on KlüberComp Lube Technology

Benefits for your application

- **The oils meet the requirements according to DIN 51517-3, CLP. Corresponding gears can be switched to Klübersynth GEM 4 N oils without prior consultation provided the general application notes are observed.**
- **KlüberComp Lube Technology involves the selection of high-quality raw materials and individual consultation and services by Klüber, ensuring high-performance lubrication of different gearbox components.**
- **Klübersynth GEM 4 N oils offer a high scuffing load resistance. Gears are sufficiently protected against scuffing even at high peak loads.**
- **The oils' high micropitting resistance acc. to FVA 54 GFT ≥ 10 offers sufficient protection to gears that are subject to high loads and would normally be susceptible to this type of damage.**
- **Good wear protection prevents premature rolling bearing failure.**
- **Much longer service life than mineral oils due to the excellent ageing and oxidation resistance of the base oil; thus maintenance intervals can be extended and in certain cases even lifetime lubrication is possible.**
- **Owing to the wide service temperature range a single viscosity grade can cover both low and high temperatures in many applications.**
- **The optimum friction behaviour of the PAO base oil reduces power losses and improves efficiency.**
- **The excellent viscosity-temperature behaviour supports the formation of a sufficient lubricating film even at elevated and high temperatures.**
- **Seals made of 72 NBR 902, 75 FKM 585 and 75 FKM 170055 are resistant to Klübersynth GEM 4 N oils. Leakage and contamination are prevented.**
- **Approved by Bosch Rexroth, SEW Eurodrive, Getriebebau Nord, Stöber Antriebstechnik, ZAE Antriebssysteme, David Brown, FLSmidth MAA Gears, ACCIONA ENERGY, etc.**

Description

Klübersynth GEM 4 N oils are gear- and multipurpose oils based on polyalphaolefin. They have a high resistance to scuffing and micropitting as laid down in FVA 54.

The good antiwear characteristics of the Klübersynth GEM 4 N oils were also proven for rolling bearings in the standard FAG FE8 test rig for gear oils.

Klübersynth GEM 4 N oils are particularly resistant to ageing and oxidation. They have a good viscosity-temperature behaviour and excellent low- and high-temperature characteristics. They also offer good corrosion protection and are neutral towards most nonferrous metals, elastomers and interior paints that are commonly used in gear construction.

Application

The Klübersynth GEM 4 N oils were specially developed for the lubrication of spur-, bevel- and planetary gears that are subject to high loads. Such gears are frequently used in the wind, steel, mining and sugar industries. Klübersynth GEM 4 N oils are also used for the lubrication of worm gears with steel/bronze material pairings and for the lubrication of plain and rolling bearings, all kinds of toothed couplings, chains, guideways, joints, spindles and pumps, especially in applications where the equipment is exposed to elevated temperatures or pronounced temperature fluctuations.

Application notes

Klübersynth GEM 4 N oils can be applied by means of immersion, immersion circulation or injection. The use of drip-feed oilers, brushes, oil cans or suitable automatic lubricating systems is also possible. The low-viscosity varieties can also be applied using oil mist lubrication. Klübersynth GEM 4 N oils are miscible with mineral oils. However, for the Klübersynth GEM 4 N oils to deliver their full performance, any residues of a previously used mineral oil should not exceed 5 % in quantity.

For use at permanent temperatures of 80 °C max., seals made of 72 NBR 902 may be used. For higher temperatures, seals made of 75 FKM 585 or 75 FKM 170055 should be chosen. It should

Klübersynth GEM 4 N, Art-No. 012229, 012230, 012231, 012232, 012233, 012234, 012235, 012236, 012237, en
Edition 23.10.2012 [replaces edition 16.10.2012]

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be noted that elastomers from one or several manufacturers can behave differently; therefore tests should be performed.

Viscosity selection

When determining the oil viscosity for gears, the manufacturer's instructions take priority. Only in cases where there are no gear manufacturer's instructions, the viscosity can be selected in accordance with the enclosed worksheet " Klübersynth GEM 4 N oils – selection of oil viscosity for gears".

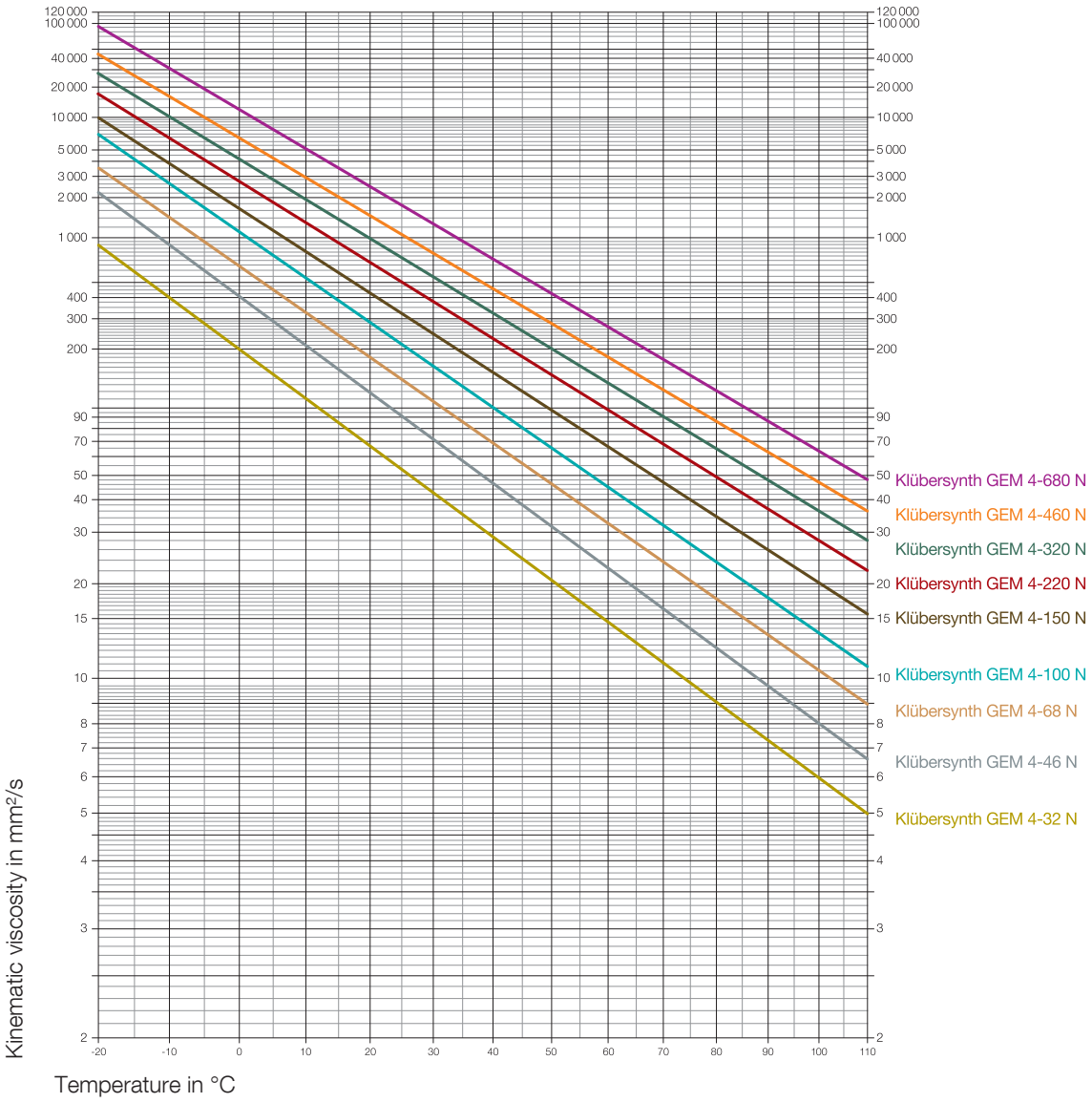
To determine the correct oil viscosity for bearings, please observe the bearing manufacturer's instructions.

For determining the existing viscosity, please refer to the enclosed viscosity-temperature diagram indicating the differing viscosity-temperature behaviour of Klübersynth GEM 4 N oils as compared to mineral oils.

Material safety data sheets

Material safety data sheets can be downloaded or requested via our website www.klueber.com. You may also obtain them through your contact person at Klüber Lubrication.

Viscosity-temperature diagram



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Pack sizes	Klübersynth GEM 4- 32 N	Klübersynth GEM 4- 46 N	Klübersynth GEM 4- 68 N
Canister 20 l	+	+	+
Drum 200 l	+	+	+

Product data	Klübersynth GEM 4- 32 N	Klübersynth GEM 4- 46 N	Klübersynth GEM 4- 68 N
Article number	012229	012230	012231
CLP classification acc. to DIN 51502 and DIN 51517-3	CLP HC 32	CLP HC 46	CLP HC 68
Classification acc. to ISO 12925-1	CKC 32	CKC 46	CKC 68
ISO viscosity grade, DIN ISO 3448	32	46	68
Density, based on DIN 51757) at 15 °C	840 kg/m³	approx. 840 kg/m³	850 kg/m³
Kinematic viscosity, DIN 51562 pt. 01/ASTM D-445/ASTM D 7042, 40 °C	approx. 32 mm²/s	approx. 46 mm²/s	approx. 68 mm²/s
Kinematic viscosity, DIN 51562 pt. 01/ASTM D-445/ASTM D 7042, 100 °C	approx. 6 mm²/s	approx. 8 mm²/s	approx. 11 mm²/s
Viscosity index, DIN ISO 2909	>= 135	>= 140	>= 140
Flash point, DIN EN ISO 2592, Cleveland, open-cup apparatus	>= 200 °C	>= 200 °C	>= 200 °C
Pour point, DIN ISO 3016	<= -50 °C	<= -40 °C	<= -40 °C
Foam test, ASTM-D 892, ISO 6247, sequence I/24 °C	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
Foam test, ASTM-D 892, ISO 6247, sequence II/ 93.5 °C	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
Foam test, ASTM D 892, ISO 6247, sequence III/24°C	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
Copper corrosion, DIN EN ISO 2160, 3 h/100 °C	1 - 100 corrosion degree	1 - 100 corrosion degree	1 - 100 corrosion degree
Anticorrosive properties on steel, DIN ISO 7120, method A, steel, 24 h/60 °C	no rust	no rust	no rust
Ageing properties, ASTM D 2893, increase in viscosity	< 6 %	< 6 %	< 6 %
FZG scuffing test, DIN ISO 14635-1, A/8.3/90, scuffing load stage	>= 12	>= 12	>= 12
FZG scuffing test, based on DIN ISO 14635-1, A/16.6/90, scuffing load stage	>= 12	>= 12	>= 12
FAG FE8 rolling bearing test, DIN 51819-3, D 7,5/80-80, wear of rolling element	<= 30 mg	<= 30 mg	<= 30 mg
FAG FE8 rolling bearing test, DIN 51819-3, D 7,5/80-80, wear of cage	<= 200 mg	<= 200 mg	<= 200 mg
Lower service temperature	-50 °C / -58 °F	-40 °C / -40 °F	-40 °C / -40 °F
Upper service temperature	140 °C / 284 °F	140 °C / 284 °F	140 °C / 284 °F
Minimum shelf life from the date of manufacture - in a dry, frost-free place and in the unopened original container, approx.	24 months	24 months	24 months

Klübersynth GEM 4-100N	Klübersynth GEM 4-150 N	Klübersynth GEM 4-220N	Klübersynth GEM 4-320 N	Klübersynth GEM 4-460 N	Klübersynth GEM 4-680 N
+	+	+	+	+	+
+	+	+	+	+	+

Klübersynth GEM 4-150 N	Klübersynth GEM 4-320 N	Klübersynth GEM 4-460 N	Klübersynth GEM 4-680 N	Klübersynth GEM 4-100N	Klübersynth GEM 4-220N
012233	012235	012236	012237	012232	012234
CLP HC 150	CLP HC 320	CLP HC 460	CLP HC 680	CLP HC 100	CLP HC 220
CKC 150	CKC 320	CKC 460	CKC 680	CKC 100	CKC 220
150	320	460	680	100	220
approx. 850 kg/m³	approx. 850 kg/m³	approx. 850 kg/m³	approx. 860 kg/m³	approx. 850 kg/m³	approx. 850 kg/m³
approx. 150 mm²/s	approx. 320 mm²/s	approx. 460 mm²/s	approx. 680 mm²/s	approx. 100 mm²/s	approx. 220 mm²/s
approx. 20 mm²/s	approx. 36 mm²/s	approx. 47 mm²/s	approx. 62 mm²/s	approx. 14 mm²/s	approx. 27 mm²/s
>= 150	>= 155	>= 160	>= 160	>= 150	>= 150
>= 200 °C	>= 200 °C	>= 200 °C	>= 200 °C	>= 200 °C	>= 200 °C
<= -40 °C	<= -35 °C	<= -30 °C	<= -30 °C	<= -40 °C	<= -40 °C
<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml	<= 100/10 ml
1 - 100 corrosion degree	1 - 100 corrosion degree	1 - 100 corrosion degree	1 - 100 corrosion degree	1 - 100 corrosion degree	1 - 100 corrosion degree
no rust	no rust	no rust	no rust	no rust	no rust
< 6 %	< 6 %	< 6 %	< 6 %	< 6 %	< 6 %
>= 14	>= 14	>= 14	>= 14	>= 12	>= 14
>= 12	>= 12	>= 12	>= 12	>= 12	>= 12
<= 30 mg	<= 30 mg	<= 30 mg	<= 30 mg	<= 30 mg	<= 30 mg
<= 200 mg	<= 200 mg	<= 200 mg	<= 200 mg	<= 200 mg	<= 200 mg
-40 °C / -40 °F	-30 °C / -22 °F	-30 °C / -22 °F	-30 °C / -22 °F	-40 °C / -40 °F	-40 °C / -40 °F
140 °C / 284 °F	140 °C / 284 °F	140 °C / 284 °F	140 °C / 284 °F	140 °C / 284 °F	140 °C / 284 °F
24 months	24 months	24 months	24 months	24 months	24 months

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Klüber Lubrication – your global specialist

Innovative tribological solutions are our passion. Through personal contact and consultation, we help our customers to be successful worldwide, in all industries and markets. With our ambitious technical concepts and experienced, competent staff we have been fulfilling increasingly demanding requirements by manufacturing efficient high-performance lubricants for more than 80 years.

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